BIOLOGICAL AND FAUNISTIC NOTES ON THE CICADIDÆ OF THE BIG BEND REGION OF TRANS-PECOS TEXAS

By E. R. Tinkham

An entomologist for the first time on the desert of southwestern Texas is singularly impressed by the insect life of the desert, particularly the great development of some groups and the paucity or total absence of others. Nor is the insect life as abundant as is often imagined, but some families such as the Acrididæ and Asilidæ and others, present a strikingly rich fauna not only by their numbers but also in the abundance of their species.

This is especially true of the Cicadidæ. In the spring-time the desert rings with their piercing shrills and trilling songs. To the cicada hunter the note of each species is as distinctive and interesting as the songs of the various warblers to the ornithologist. He comes to know them by the power and pitch of the trill, and is ever listening for a song that is strange and new. To the uninitiated, and perhaps the uninterested, the song of any one cicada sounds like all the others. Furthermore a cicada singing on the desert means more to the cicada collector and student than does a cicada in Louisiana, Minnesota, or any other wooded state, simply because, in the latter regions, the cicada is nearly always up in some tall tree, often impossible to locate and as difficult to approach and capture. In contrast, the vegetation on the desert is usually short and sparse, enabling the hunter to readily locate the cicada and perhaps capture it. On the other hand the higher temperature, the clarity of the atmosphere and the openness of the cover make the cicada extremely wary and it is usually found in some thorny tree or bush such as mesquite, ocotillo, or catclaw, or hiding among the spines of the prickly pear. The cicada collector trying to capture his specimen under these conditions usually attempts it only once for no matter of what strong construction the bag of the net is made, it is often badly torn and tangled up amongst the claws and spines. The cicada invariably escapes.

To capture desert cicada, the writer achieved excellent results with a *cicada swatter*. This is built on the same principle as a huge fly swatter. To construct it requires only a few minutes' work. A stick of wood some four or five feet long and an inch in thickness is selected for the handle. Then a piece of wire screen about ten inches wide and fourteen inches long is cut out and the base reinforced by folding in the corners at one end. This reinforced base is tacked on strongly to the end of the handle and the swatter is ready for use.

The hunter cautiously approaches the wary cicada trilling on some ocotillo stem, or other spiny plant, with the cicada swatter outstretched at arm's length and off to one side of the singer. When about even with it a sudden swinging blow catches the cicada on the plant or just as it commences to fly away, the flexible screen wire stunning it and knocking it to the earth, where it can readily be retrieved. On the morning of June 8, 1930, in the Chinatis Mountains of Presidio County, Trans-Pecos Texas, the writer caught forty males and seven females of the rare and wily *Tibicen townsendi* Uhler by this method. It was possibly 90 per cent effective, only a few cicadas making an escape. Only by this method could the species have been captured, for it is exceedingly wary. It was difficult enough trying to get within striking distance with the swatter, let alone trying to use an insect net.

The writer's attempts to photograph the trilling Townsend cicada at a distance of several feet proved quite a different matter and far more exasperating, and it was indeed taxing on patience, as well as on energy, to do this under a blazing desert sun. In his studies on cicadas as part of a large-scale plan to study the animal and plant life of the desert of southwestern Texas, the writer had hoped to obtain photographs of the mode of trilling in the various species of cicadas of that region. Unfortunately a number of those taken were ruined for reproduction by a somewhat faulty bellows. The writer left the desert regions before he had completed his studies.

It is hoped that the following notes made from the writer's experience during the summers of 1929 and 1930 will be of some value to the student and contribute towards an understanding

of the cicadas of this particular region. From time to time the author plans to publish notes and papers on the desert life of this region. Three have already appeared[1] and others are being prepared.

The writer wishes to thank Mr. Wm. T. Davis who has been most gracious and prompt in determining the Cicadas collected by the author.

FAUNAL DISTRIBUTION

The Big Bend region, that area of Trans-Pecos Texas lying north of the Big Bend of the Rio Grande and extending north through the Davis Mountains area, may be divided into several vegetational types or faunal regions. These represent two main types, the Lower and Upper Sonoran Faunal Zones, and each is characterized by plants and animals more or less peculiar to it. Due to the rugged physiography of the region however these two zones are never uniform, floristically speaking, but each is a composite of various plant groups of various sizes called associations or, in a more restricted sense, communities, and each of these has its own dominant plants. Nor is there any sharply defined line but one zone merges imperceptibly into the other.

The Rio Grande Valley proper is dominated largely by mesquite *Prosopis chilensis,* with scattered groves of cottonwoods and willows occurring along old water courses. In places where the soil is alkaline, screw mesquite *P. pubescens,* occurs, and catclaw, *Acacia greggii,* is found in adobe arroyo flats. Along the margin of the Rio Grande impenetrable thickets of Mexican jara, *Baccharis glutinosa* abound, but of all, the mesquite is the dominant plant.

The mesa commences as a low escarpment running more or less parallel to the river and at about one mile distant from the river. It gradually rises in elevation northward to merge with the lower slopes of the Chinati Mountains about 20 miles to the north. Everywhere it is transversed by numerous arroyos which have cut

[1] The Odonata Fauna, Can. Ent., October, 1934.
The Mutillid Fauna, Can. Ent., October, 1935.
Western Orthoptera Attracted to Light, JOUR. N. Y. ENT. SOC., 46: 339–353.
The Orthopteran Fauna, MS., 175 pages.

valleys of various sizes into the mesa. The mesa is dominated by the creosote bush, *Covillea tridentata,* with scattered plants of Spanish dagger, *Yucca macrocarpa,* and Ocotilla, *Fouquieria splendens,* which is often called the "Flame of the Desert." Many species of cactus abound, chief of which are the prickly pear (*Opuntia* spp.). Patahaya (*O. stramineus*) and in certain areas cane cactus (*O. arborescens*) forms communities of its own. In the arroyo valleys crossing the mesa, mesquite, *Condalia ovata,* desert willow, *Chilopsis linearis,* and other plants are found along the margins of the dry streams. In other regions where the soil is sandier, especially the large alluvial sand fans built up at the mouth of larger arroyos coming into the valley, Huisache, *Acacia farnesiana,* narrow-leaved yucca, *Yucca elata,* and desert willow are dominant, with clumps of *Covillea* here and there.

Many of the valleys in the Chinati Mountains have mesquite, catclaw and condalia along the stream beds, and in the larger arroyos, where water occurs, cottonwoods are found.

The lower levels of the Chinatis ranging from 4500 to 5500 feet, are dominated by Sotol, *Dasylirion texana,* and Lechuguila, *Agave lechuguilla,* with Covillea, Ocotilla, Huisache, and other shrubs and plants present. Above 5500 feet grasslands predominate on the mountain plateaux with live oak, *Quercus virginiana,* and scrubby Mexican walnut, *Juglans ruprestis,* found on the steep northern slopes. Red cedar, *Juniperus monosperma,* occurs on the peaks at approximately 6500 feet elevation.

The northern part of Presidio and the southern portions of Jeff Davis counties, comprising a considerable portion of the Big Bend Region, is a level, far-stretching grassland dominated by various species of *Bouteloua* or gramma grass, with considerable bear grass, *Nolina texana,* on its southern margin, where it merges with the desert vegetation of the Lower Sonoran. On the north, these grasslands, representing the Upper Sonoran, stretch throughout the valleys of the Davis Mountain range and merge with groves of live oaks in the valleys and with oaks, and cedars, on the mountain slopes. At higher elevations the Piñon pine, *Pinus edulis,* is found.

DISTRIBUTION OF THE ASSOCIATED CICADA FAUNA

The distribution of the cicada fauna, dependent as it is upon

the flora, for the nymphs feed upon the roots and the adults suck the sap of various plants, presents a number of very interesting features.

The dominant cicada of the Rio Grande Valley proper is *Diceroprocta cinctifera.* This species is practically restricted to the impenetrable thickets of mesquite and the nymphs probably feed on the roots of the mesquite. This species is also found in the arroyo valleys of the Chinati Mountains, but only where mesquite occurs.

Where the sandy alluvial fans cross the valley floor, the dominant cicada is *Diceroprocta eugraphica.* It is found most commonly singing in creosote, but occasionally in catclaw and other plants.

On the mesa proper, *Cacama calvata* is very abundant and appears to be restricted to Ocotillo. The exuviæ are commonly found on the mesa floor, but whether the nymphs feed on Ocotillo, creosote, or perhaps prickly pear, remains to be ascertained. The adults probably prefer Ocotillo, for the narrow upright stems afford a good trilling surface and enable the wary cicada to observe the approach of enemies. The adults also feed on prickly pear and when disturbed appear to possess a strong heliotropic response, rocketing towards the sun with a loud screeching trill.

Beameria venosa, one of the smallest of the Nearctic Cicadidæ, is found feebly trilling in grasses and low plants such as lechuguilla and the skeleton weed, *Candelaria,* along the sides of arroyos and at low elevations in the Chinati and Davis ranges.

In the arid Chinatis the striking cicada dominant is the large handsome *Tibicen townsendi* Uhler. This species is found trilling on Sotol, Huisache and Ocotillo. Plate VI, Figure 1, illustrates a male Townsend cicada trilling in a Huisache bush; the photograph was taken during the actual progress of the song. Figure 2 shows a Townsend female in the act of ovipositing in the broken-off stub of the flower stalk of a Sotol plant. Upon examination this stub was found to have numerous oviposition scars of previous years and Sotol is undoubtedly the host plant of this interesting cicada.

In the Davis Mountains at Paisano, *Tibicen inauditus* Davis was found in the live oak trees (*Quercus grisea*) but it is not a common species. It is not known whether the nymphs feed upon

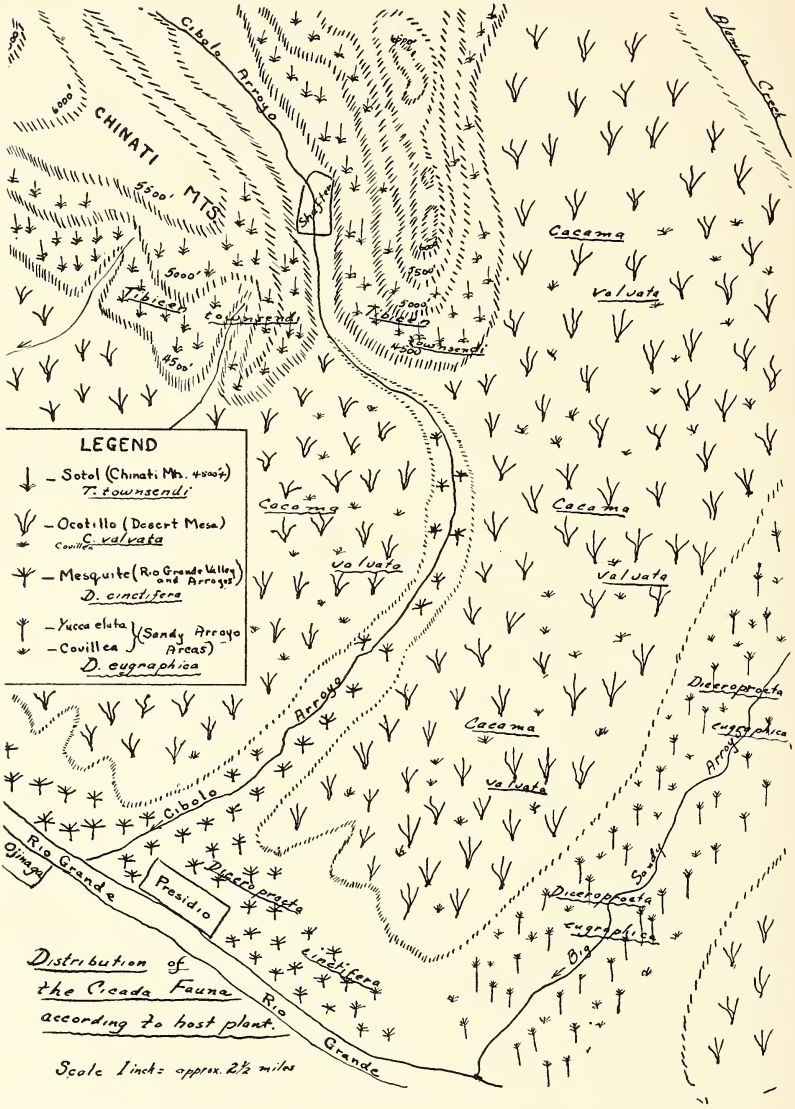

FIG. 1. Distribution of the cicada fauna according to host plant.

the live oaks. In this same general region adults of *Beameria venosa* were common in the grass and *Pacarina puella* Davis was taken rarely in the cedars, which may also be the nymphal host plant.

Of other species of the region the writer has little to offer from personal experience. The Gottholt Brothers of Marfa informed me that *T. dorsata,* with its piercing song, sings in the oak trees of the Davis mountains during the month of August. Davis (1932) reports *Cicada chisos* from the Davis Mountains and was there associated with *Tibicen inauditus* in the oak trees. Davis states that it is a much shyer species than *inauditus* and recognized by its pulsating "ticker-ticker ticker" note. In the same paper Davis describes the variety *limpia* of *D. cinctifera* from Limpia Canyon in the Davis Mountains. This variety is structurally different from *cinctifera* and probably represents a geographically isolated race of the species. It was found in cottonwoods, whereas *cinctifera* is mainly a denizen of mesquite thickets. In the same publication Davis describes the interesting *Okanagodes terlingua* from Terlingua but without any faunistic notes. As the writer has been in the Terlingua area on a number of occasions he wishes to say that that area is Lower Sonoran and almost entirely composed of creosote mesa. *Terlingua* is unquestionably a Lower Sonoran species with creosote as its probable host plant. Two other species have been described in recent years from the Chisos mountain area, namely *Tibicen chisosensis,* in 1934, and *Diceroprocta canescens,* in 1935. Unfortunately no faunistic notes were given with the specimens by the various collectors. *Canescens* occupies the area north of the Chisos which is predominately creosote mesa for miles and miles. Its distribution and association with *D. eugraphica* undoubtedly stamps it as a member of the Lower Sonoran Faunal Zone. Little is known of *T. chisosensis,* but it is probably a species of the oak belt in the Chisos Range.

SEASONAL DISTRIBUTION

The first cicada to appear on the desert mesa of the Rio Grande Valley, at Presidio, is the large *Cacama valvata.* In the spring

of 1929 it reached its maximum abundance in early May and it was then so abundant as to make the desert ring with its high-pitched, piercing trill. A few specimens first appear towards the end of April with the maximum in mid May to disappear in June. The species starts to sing at about 10:00 to 10:30 A.M., when the temperature ranges about 82 degrees Fahrenheit; the sun passing under a cloud causes a lull in the song.

Cacama is soon followed by *Diceroprocta cinctifera* and *D. eugraphica* which commence to emerge in early May and reach their greatest numbers in late May or early June. From that time on their numbers begin to dwindle although there are some that are still present in July. The writer took one specimen of *cinctifera* in September, 1928, but such a catch is rare and may represent a fall brood emergence. The small *Beameria venosa* (Uhler), formerly placed in the genus *Proarna*, appears later on in May to reach its maximum in June. *Pacarina puella* though not common appears to be commonest in June.

Tibicen townsendi, an inhabitant of the desert mountains, starts to emerge in late May to reach its greatest numbers in mid June and by the middle of July only a few worn individuals remain. *T. inauditus* appears to be commonest in mid June. *T. dorsata* is a late summer species appearing in the Ft. Davis region of the Davis range in August. Although not observed *T. duryi* appears in the months of June and early July and of the species discussed is probably the only one pertaining to the Transitional Faunal Zone.

In general May and June are the Cicada months, July still possesses many but few persist through August into September.

SONG AND MODE OF TRILLING

Although it may not be possible to differentiate each species by its mode or position assumed while singing, it would appear from field observations that the various genera may be distinguished.

The genus *Diceroprocta* assumes a very interesting and characteristic attitude while trilling, raising the anterior portion of its body away from the resting surface by straightening the

anterior legs so that the longitudinal axis of the body is tilted at an acute angle away from the supporting surface. While in this position the wings are drawn sharply downwards below the body so that the wings usually project beyond the further side of the mesquite limb upon which it is usually trilling. *D. cinctifera* and *D. augraphica* are alike in this respect as is also *D. apache* from the desert regions of Arizona and southern California. The song of *cinctifera* is a loud metallic zing; of *eugraphica* less voluble and less metallic.

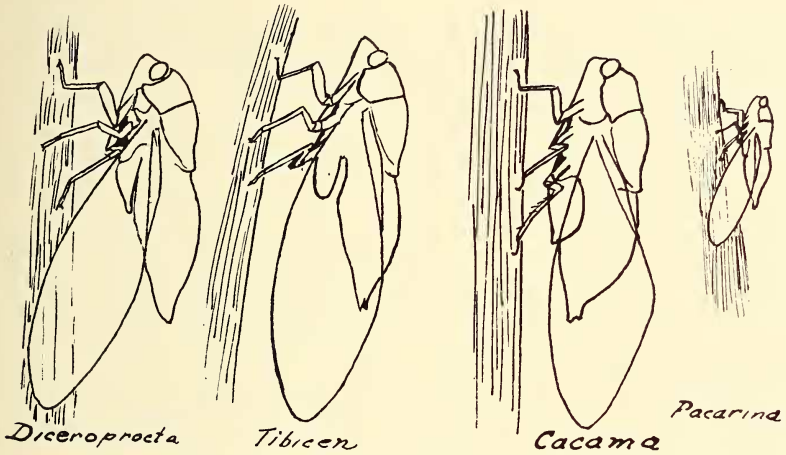

Fig. 2. Positions assumed by *Diceroprocta, Tibicen, Cacama* and *Pacarina* while trilling.

Cacama valvata, the only species of Cacama in the region, trills with the longitudinal axis of the body and wings nearly parallel to and raised off of the supporting plane. The song has a high-pitched, piercing, metallic ringing quality to it.

Tibicen resembles *Cacama* closely in the position assumed but the abdomen is more arched and deflexed at the apex and the axis slightly subparallel caudally (see photograph of male singing). The song of *T. townsendi* of the Chinatis has a high-pitched, metallic ringing quality to it. Although not personally observed the song of *T. dorsata* is said to be piercing like a steam whistle.

Pacarina tilts slightly with its wings drawn downwards sug-

gesting, to a certain degree, a miniature *Diceroprocta*. *Beameria*, being a feeble triller of minute size, exhibits no peculiarity but rests and sings in the same position.

COLLECTIONS AND DISTRIBUTIONAL NOTES

Actual specimens recorded here were taken by the writer; other notes on various species are derived from the publications of Wm. T. Davis.

Tibicen townsendi Uhler

Abundant on Sotol in Chinati Mts., Presidio Co., Texas, 40 ♂, 7 ♀, June 9, 1930; 1 ♂, July 14, 1929 (worn). Chisos Mts., Brewster Co., Texas, 1 ♂, July 17, 1930 (at north base of Mt. Emory at about 5500 feet elevation). This species is known from southwestern Texas, New Mexico and Arizona.

Tibicen inauditus Davis

Paisano, Jeff Davis Co., elev. 5200 feet, 4 ♂, June 23, 1930 (*Quercus grisea*). Davis records this species from Western Texas, and the Chisos mountains, New Mexico and Oklahoma.

Tibicen duryi Davis

Reported by Davis from 8000 feet in the Davis Mts., and 7000 feet in the Chisos; also known from Utah, northern Arizona, Colorado and New Mexico.

Tibicen chisosensis Davis

Davis described this species, in 1934, from specimens taken in the Chisos Mountains by Dr. Dana Casteel and Mr. H. B. Parks, Jr., of the University of Texas.

Diceroprocta cinctifera (Uhler)

Common on mesquite at Presidio in the Rio Grande valley, in valleys of the Chinati Mountains having mesquites and from mesquite arroyos some 20 miles north of the Chisos Mountains and the Chisos Mts., July 17–18, 1930. Davis records *cinctifera* from central Texas, Rio Grande valley, New Mexico and Arizona. The distribution of this species up the Rio Grande valley from central Texas is probably accounted for by the distribution of its host plant, mesquite.

Diceroprocta cinctifera var. *viridicosta* Davis

This variety was described from the Del Rio region within recent years.

Diceroprocta cinctifera limpia Davis

Davis described this new race, in 1932, from Limpia Canyon in the Davis mountains. It probably represents an isolated geographic race long separated from the main distribution of *cinctifera* in the Rio Grande Valley.

Diceroprocta eugraphica Davis

A common species of the region found mainly on *Covillea* at Presidio, the Chinati Mountains, Marfa, Chisos Mountains and the creosote-covered desert forty miles north of the Chisos Mountains, from June to late July. The Chisos records were made July 17–18, 1930. This species was described from New Mexico and it is also known from Kansas, Oklahoma, Texas and Arizona.

Diceroprocta canescens Davis

This interesting new species was described, in 1934, from the region north of the Chisos Mountains. It was associated with *D. eugraphica* and is undoubtedly a member of the Lower Sonoran Fauna.

Diceroprocta texana Davis

Carlsbad, N. Mex., 3♂, July 19, 1930 (E.R.T.; on *Prosopis glandulosa*). This species has been reported from Uvalde, Del Rio, Midland and other localities in Texas and New Mexico.

Diceroprocta bibbyi Davis

This species was named in honor of my friend Mr. F. F. Bibby who collected the series at Langtry, Texas. Since then it has been taken in the Chisos Mountains. It is commonly found on creosote bush.

Cacama valvata Uhler

This species is common on Ocotillo and creosote at Presidio in May, 1929; Chinati Mts., June 7 and July 6, 1930, and Paisano, June 29, 1930. Davis reports this species from Colorado, Texas,

Utah, New Mexico and Arizona where the species is common in late May and early June on the mesas of creosote, mesquite and Cholla.

Cicada chisos Davis

One specimen taken near Marfa, without date, was in the Gottholt Collection at Marfa. The species was described from the Chisos Mountains, in 1916, and further reported from Alpine, the Davis Mts., and Mexico. This species dwells in oaks associated with *Tibicen inauditus.*

Pacarina puella Davis

Paisano, elevation 5200 feet, 4 ♂, June 23, 1929 (cedars). Davis reports this species from Louisiana, Texas, Oklahoma, Arizona and northern Mexico.

Okanagodes terlingua Davis

Described by Davis in 1932 and known only from the type locality, Terlingua, in Brewster County, Texas. The species is a member of the Lower Sonoran Faunal Zone.

Platypedia falcata Davis

A single specimen, the type, was described from El Paso, Texas, in 1920.

Beameria venosa (Uhler)

Chinati Mts., June 16, 1929, common on grass and lechuguilla. Paisano, June 23, 1929 (common in grass). In 1934 Davis erected the new genus *Beameria,* in honor of Dr. Raymond Beamer, for *Prunasis venosa* Uhler which had, in 1911, been placed in the genus *Proarna* by Distant. This species is known from Nebraska, Kansas, Oklahoma, Colorado, New Mexico and Arizona.

FAUNAL DISTRIBUTION

In a more comprehensive study on the wonderfully developed Orthopteran fauna of the Big Bend Region of Trans-Pecos Texas, which is in manuscript form but unpublished, the writer has ascertained the existence of a Mexican Sonoran fauna in this

region. East of the Continental Divide this fauna is known only from the Chinati Mountains of Presidio County and the Chisos Mountains of Brewster County of the Big Bend Region of Trans-Pecos Texas. South of these regions this particular fauna extends far southwards into Mexico. West of the Continental Divide this fauna appears only in south-central Arizona in the mountains extending from the Baboquivaris on the west, through the Tumacacoris and Santa Ritas to the Huachucas on the east.

From these studies the writer felt it necessary to divide the Lower and Upper Sonoran Faunal Zones into two component faunal elements which in this paper will only be briefly outlined.

A. Lower Sonoran Zone
   a. American Lower Sonoran Fauna—characterized by the desert areas of western Texas, Arizona, southeastern California and southern Nevada with creosote [*Larrea* (*Covillea*) *tridentata*] the dominant plant.
   b. Mexican Lower Sonoran Fauna—a fauna composed of Mexican species finding their northern limits of distribution in the Chinati and the Chisos Mountains of the Big Bend Region of Trans-Pecos Texas and in the Baboquivaris, Tumacacoris, Santa Ritas, and Huachucas of southern Arizona with Ocotillo, Agave, Sotol and Cacti, the dominant plants.

B. Upper Sonoran Faunal Zone
   a. American Upper Sonoran Fauna—characterized by grasslands at elevations generally above 5000 feet to 6500–7000 feet which extend from the Davis Mountains, the Highlands of northern Mexico and the southeastern corner of Arizona, north through New Mexico to the southeastern tip of Alberta and east of the Rockies to the Missouri River in North Dakota and the central portions of South Dakota, Nebraska and Kansas, western Oklahoma and the Panhandle region of Texas.
   b. Mexican Upper Sonoran Fauna—ranging in elevation from 5000 to 6500 feet in the Chinatis and Chisos Mts., of the Big Bend region of Trans-Pecos

and the Baboquivaris, Tumacacoris, Santa Ritas and Huachucas of southern Arizona and composed of an oak-savannah type of vegetation.

C. Transitional Zone—generally represented by the pine belt in the mountains of the southwest and ranging from elevations of 6500 and 7000 feet to the upper limits of the pines at approximately 9500 feet altitude.

FAUNAL DESIGNATION OF THE CICADIDÆ OF THE BIG BEND AND THE TRANS-PECOS TEXAS REGIONS

A. Lower Sonoran Faunal Zone

a. American Lower Sonoran Fauna

Big Bend Region	Trans-Pecos Texas Region
noran Fauna Big Bend Region	*D. cinctifera*
Diceroprocta cinctifera	*D. eugraphica*
Diceroprocta eugraphica	*D. cinctifera viridicosta*
Cacama valvata	*D. texana*
	D. delicata
	C. valvata
	Platypedia falcata

b. Mexican Lower Sonora Fauna

Tibicen townsendi	*T. townsendi*
Tibicen chisosensis	*T. chisosensis*
Diceroprocta bibbyi	*D. bibbyi*
Diceroprocta canescens	*D. canescens*
Okanagodes terlingua	*O. terlingua*

B. Upper Sonoran Faunal Zone

a. American Upper Sonoran Fauna

Tibicen inauditus	*T. inauditus*
Tibicen dorsata	*T. dorsata*
Diceroprocta cinctifera limpia	*T. montezuma*
Pacarina puella	*D. cinctifera limpia*

Beameria venosa	*D. vitripennis?*
	P. puella
	B. venosa
	Melampsalta texana?

b. Mexican Upper Sonoran Fauna

Cicada chisos	*Cicada chisos*

C. Transitional Faunal Zone

Tibicen duryi	*T. duryi*

HOST PLANT PREFERENCE OF THE CICADIDÆ OF THE BIG BEND REGION

Species	Adult Host Preference	Probably Nymph Host
Tibicen townsendi	Sotol and Huisache	Sotol
T. inauditus	Oaks	Same
T. dorsata	Oaks	Same
T. duryi	Oaks or pines	Same
Diceroprocta cinctifera	Mesquite	Same
D.c. limpia	Cottonwoods	Same
D. eugraphica	Creosote, catclaw	Same
D. bibbyi	Creosote, mesquite	Same
D. canescens	Creosote, mesquite	Same
Cacama valvata	Ocotillo, creosote, prickly pear	Same
Cicada chisos	Oaks	Same
Okanagodes terlingua	Creosote	Same
Pacarina puella	Cedar	Same
Beameria venosa	Grass, lechuguilla	Same

ENEMIES OF CICADAS—INSECTS AND BIRDS

One would hardly imagine that cicadas, especially those of large size and as wary and swiftly-flying as they are, should have their enemies.

It is hoped that the notes here appended will serve as a small contribution to this obscure subject. They all pertain to one of the largest cicadas of the region, namely, *Cacama valvata.* It is generally known that the large wasp, *Sphecius speciodes* Uhler, is a cicada predator. On one occasion the writer had an oppor-

tunity to observe this predatism. About the end of May, 1930, he was near a colony of these cicada wasps breeding in the sandy banks of an irrigation ditch, close to a pumping station on the north banks of the Rio Grande. Suddenly a large object came flying and buzzing along from across the Mexican side of the river into the colony and upon capture the writer found in his net a large cicada wasp and a teneral adult of *Cacama valvata.* Later on in the summer at another place, he observed a large metallic blue Sphecoid wasp, probably *Chlorion cyaneum,* light with a specimen of *Cacama* near the entrance to its burrow. The cicada was left at the mouth of the burrow while the wasp made a preliminary inspection of its tunnel. Returning, it seized the cicada by its head and dragged it, head foremost, down into the host chamber previously excavated for some unfortunate insect.

Stranger still was the accidental discovery made one evening in June at about dusk. The writer was out on the desert near Presidio and happened to have along a 410 gauge bird collecting pistol. Suddenly he came upon a Texas night hawk, *Chordeiles acutipennis texensis* Lawrence. The actions of the bird seemed to indicate something was wrong for it could fly only with difficulty and the end of its body seemed to be very heavy, causing the creature to fly in a peculiar manner. As the writer was licensed, he was prompted to shoot, and fortunately so, for upon examination the abdomen was found to be greatly distended. Later when skinning the bird it was found that this enormous distention was caused by the greatly swollen gizzard. Imagine the writer's surprise when, on dissection, he found the gizzard contained five large and freshly engorged specimens of *Cacama valvata.* The writer could not restrain his astonishment, for he had always supposed that nighthawks fed exclusively on mosquitoes and small insects, but here were five large cicadas in the gizzard of a single bird. How this night hawk captured these large, fast-flying cicadas by swooping them into its mouth is rather difficult to picture. No other explanation, however, seems plausible, as the feet of night hawks are very small and weak and entirely unfitted for grasping objects while on the wing. Furthermore, they cannot even perch upon a limb. It has been generally thought that night hawks and the related whip-poor-

wills and poor-wills are insectivorous only on small insects, such as mosquitoes, gnats, midges, flies, and similar insects that swarm in the crepuscular light of dusk and dawn. Their mouths, however, are cavernous in proportion to their heads and from these observations it appears that they use them to their fullest capacity. Probably in the height of the cicada season these avians of the twilight hours will live almost exclusively on cicadas. Unfortunately the writer made no further efforts to secure specimens of nighthawks for stomach content analysis. The food habits of even our commonest birds are only partially known; here surely is a field for useful scientific exploration.

FALSE CICADAS

A number of large desert species of the Coleopterous family, Buprestidæ, stridulate so deceptively that they can easily deceive a person familiar with the songs of the various species of Cicadidæ. The buprestid that produces the most baffling song is the large Huisache wood-borer, *Psiloptera drummondi* Cast. This species is usually heard trilling in clumps of the desert shrub called Huisache, *Acacia farnesiana,* which appears to be its host plant, at noon or in the early afternoon on very hot summer days in August and September. Another rarer species is *Hippomelas sphenicus,* which has a coarser and more staccato-like song. It is found on mesquite. I have also observed a similar habit in the far north for *Dicera prolongata* trilling on white poplar, *Populus tremuloides,* in Glacier National Park, Montana, and at Edmonton, Alberta. In *Dicera* the elytra are raised well above the abdomen, but the song is softer than that of the desert species. The sound in the larger desert species, such as *Psiloptera drummondi,* can be likened to the staccato noise produced by a riveting machine. Trilling may be found to be of common occurrence among the larger species of the Buprestidæ.

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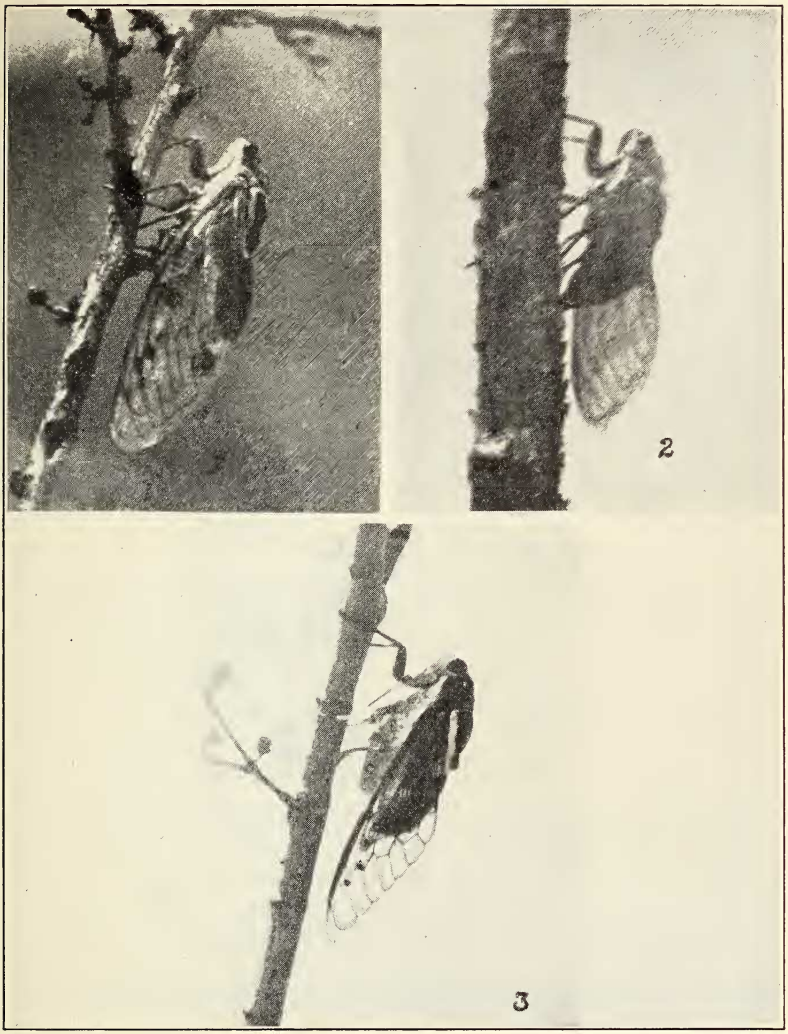
PLATE VI

Figure 1. Male *Tibicen townsendi* photographed while singing on Huisache bush.

Figure 2. Female *T. townsendi* ovipositing in the dry broken-off stub of a Sotol plant (*Dasylirion texana*).

Figure 3. Male *Cacama valvata* trilling in a Creosote bush.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